ENHANCED METHOD AND SYSTEM FOR CATEGORY SELECTION

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Reference to Related Applications

5   This application claims the benefit of and incorporates by reference the following

applications:

U.S. Provisional Application Serial No. 60/237,243 filed on October 2, 2001; Method

and System of Entering Search Criteria Using Multiple Entry Fields per Data Element, U.S.

Serial No. 60/238,577 filed October 6, 2000; Method and System for Combining User-Supplied

10   Sort Information with Secondary Sort Information, U.S. Serial No. 60/238,791 filed October 6,

2000; Method and System for Organizing Information into Visually Distinct Groups Based on

User Input, U.S. Serial No. 60/238,587 filed October 6, 2000; Enhanced Method and System for

Viewing Any Search Result Without Returning to the Result List, U.S. Serial No. 60/238,754

filed October 6, 2000; Method and System for Pre-Filling Search Criteria into a Form, U.S.

15   Serial No. 60/237,249 filed October 2, 2000; Enhanced Method and System for Storing and

Managing Search Criteria, U.S. Serial No. 60/237,254 filed October 2, 2000; Method and

System for Organizing Search Results into a Single Page Showing Two Levels of Detail U.S.

Serial No. 60/237,252 filed October 2, 2000 and Method and System for Modifying Search

Criteria Based on Previous Search Date, U.S. Serial No. 60/237,250 filed October 2, 2000.

20   **Copyright Notice**

Field of the Invention

The invention relates generally to information retrieval from data repositories, and more particularly to an enhanced method and system for users to select one or more categories as part of search criteria.

Background of the Invention

As a society, we are increasingly becoming both dependent on and overloaded with information, especially data that is stored in computer databases or full-text collections. As the quantity of information stored in these data repositories increases, the complexity of retrieving relevant information also increases. To locate information, users search general collections (e.g., AltaVista, Excite, InfoSeek, Lycos, Yahoo, etc.) as well as specialized sources which may be implemented with back-end databases, such as those dedicated to locating employment opportunities (e.g., CareerBuilder, CareerPath, Headhunter.net, HotJobs, Monster.com, etc.). According to recent studies from technology analysts (e.g., the Jupiter Group and Forrester Research), Internet searching is the most common online activity next to sending/receiving e-mail communications.

Data repositories may take on several forms, including relational databases, hierarchical databases, and flat-file databases, all of which support and may require searching within specific

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fields or columns, full-text collections which may or may not support searching within fields or delimited portions of documents that are represented as fields, and/or one or more documents. As used herein, the term "data element" refers to a database field, a delimited portion of a document, meta information associated with a document, or to an entire document. As used herein, the term

5   "data object" refers to a database record, a document, or some other grouping of associated data elements. As used herein, the term "data unit" refers to the value or contents of a data element. As used herein, the term "page" refers to a document or page on the World Wide Wide or other public or private network, e.g. a continuously scrollable body of information which may or may not include so-called "frames," (i.e. portions that do not scroll automatically when other portions

10   of the page are scrolled). As used herein, the term "query" will be used as a synonym for the phrase "search criteria."

According to user interface conventions for MacOS and Windows, there are standard controls that are used in certain situations. Two of the key factors in deciding which control to use are the total number of options that are directly related, and whether only one option or more

15   than one option may be selected at once. The standard controls for these four combinations are:

(1) up to 7 options, one selection allowed: radio buttons

(2) up to 7 options, multiple selections allowed: checkboxes

(3) more than 7 options, one selection allowed: pop-up menu (MacOS) or drop-down menu (Windows)

20   (4) more than 7 options, multiple selections allowed: scrollable list or list box

The threshold of 7 comes from the guideline well-known among usability professionals as the "5 plus or minus 2" rule, which is a modified form of the principle articulated by

psychologist George A. Miller in the 1950s with his publication *The Magical Number Seven,*

Plus or Minus Two: Some Limits on Our Capacity For Processing Information. (The distinction

between the two ranges is not significant here since the number of options discussed next easily

exceed 9.)

5   The other key consideration in selecting a particular control is the amount of space

occupied by the control. Therefore, a pop-up / drop-down menu, or, less commonly, a scrollable

list, may be used when space is at a premium even if there are only a few options.

On many Web search sites that support searching within certain data elements,

"Category," "Industry" or similar is one of the primary data elements displayed on the search

10   form. For example, the typical job search site includes well over a dozen options for the

"Category" data element. As expected from the above user interface conventions, job search sites

that only allow one category selection typically use a pop-up / drop-down menu control for the

category, and, job search sites that allow multiple category selections typically use a scrollable

list with 4-5 options visible at once.

15   For this number of items, the choice of a scrollable list is further reinforced by many

HTML books, e.g. *Chapter 17, Programming Web Pages with CGI* of UNIX Unleashed, Internet

Edition by Robin Burk; David B. Horvath, CCP; and Matthew Curtin (stored at

http://pluto.phys.nwu.edu/~zhaoyj/learn/Unix-internet/ch17.htm as of this writing) documents

the HTML elements or tags that implement a scrollable list ("select" and "option") as follows:

20   SELECT and OPTION

The SELECT and OPTION tags provide a way to define a menu of options and capture the user's selection. Although you could hard-code this functionality using checkboxes and radio buttons, the SELECT list *provides a more sophisticated menu effect* and *saves considerable screen space* if the selection list is long.

5   As with the INPUT TYPE=file construct, different browsers may display a SELECT menu in somewhat different ways. All will, however, *provide the user with a scrollable list of options* from which to choose.

[emphasis added in both cases]

However, because a scrollable list does not, either in general or in the case of the typical
10   job search site, show all items at once, it has a number of drawbacks for use in category selection.

In order to select multiple categories, a user must generally hold a modifier key (e.g. the "control" key on Windows, the "command" key on Macintosh) to select each additional category. If the user forgets (or slips or otherwise does not hold the key while selecting each additional
15   category), all previous selections will become unselected. Because previous selections are often scrolled out of view, the user may not realize that previous selections are no longer selected. Or, having once made the mistake, the user may as a matter of caution scroll back to at least one other selection to verify that it is still selected. In either case, the uncertainty and/or extra action can slow down data entry and increase frustration.

In many domains, including job search, there is nothing approaching a universally recognized set of categories. In practice, the categories vary widely from one job search site to another in number, in actual category name, and in meaning (i.e. it's not simply a matter of different names or terms for what are essentially the same categories). When categories are sorted alphabetically by category name, as is usually the case, the categories which are likely to be of interest to any specific user will almost always be spread throughout the list, forcing the user to scroll through the entire list in order to determine which categories are most appropriate. Most job sites limit the user to a selection of 5 or so categories, so the option of selecting anything which might possibly be appropriate is not available as a time-saving workaround. With many of the categories in the list hidden from the user at any given time, it's impossible to tell at a glance how many items have already been selected. For long lists, it takes time to scroll back through and count selections. If the user reaches the limit of how many selections are allowed before reviewing the entire list, and then finds better choices, even more time is required to scroll back and forth to decide which are the best 5 choices.

Figure 1 illustrates a typical category list, displaying each unit of 5 separately to indicate how much scrolling is required to view all categories. Figure 1 also illustrates sample selections for a real-world job search: a software engineer interested in high-tech contract/consulting work. The selections span most of the list, which, when viewed only 5 at a time, is considerably less manageable than when all items are visible as in the example.

These problems could be partially overcome by sizing the scrollable list such that no scrolling is required, though no known site takes this approach. This solution would require a large amount of vertical screen space, still requires that the user hold a modifier key while

selecting or unselecting any item, and still requires that a user scan the entire list to find relevant

categories. Beyond these problems, some site designers may either have not considered the

solution or be reluctant to implement it since keeping the number of visible items under 7 or 9

appears to conform to the "5 (or 7) plus or minus 2" rule discussed above.

5   Some sites group the categories into a hierarchy, as shown in Figure 2. However,

according to widespread user interface convention, a scrollable list is used to group equivalent

items. Therefore, breaking this convention by including two different types of items ("parent" vs.

"child") in a list is confusing. Will selecting a parent item search for just that exact category,

every "child" item of the parent, or, if the parent items are intended just as labels, perhaps

10   nothing at all? It is rarely made clear. In any case, this approach still leaves many problems, e.g.

the entire list must still be scanned to see every parent category and thus to decide which one or

more parent categories are most relevant.

When the user returns to a query page with a scrollable list that contains selections,

whether because they made the selections earlier in the current search session or because they

15   previously stored the query, or otherwise, the conventional implementation of a scrollable list

prevents them from seeing which items are selected -- except in the rare case that all of their

selections happen to be at the top of the list. A few sites work around this problem by adjusting

the list order (or adding additional items) to include the user's selections at the top of the list.

However, that approach violates the usability principle of "perceived stability," that is, the

20   interface changes out from underneath the user in an unpredictable manner. (This principle is

discussed, for example, on p. 11 of the Macintosh Human Interface Guidelines, copyright 1992.)

It also makes the previously discussed use of hierarchy within the scrollable list even more

troublesome. For example, if a "child" category was selected, should the "parent" label also be moved to the top? If not, is the category name of the "child" unambiguous when removed from the parent?

While the measured amount of wasted time and increased frustration caused by a scrollable list may be small for a given user in a single session at a single site, the time and consequent frustration can quickly add up over multiple sessions, with this total multiplied since most users visit many sites for a single purpose (e.g. searching for a job), and further multiplied when visiting other search sites (e.g. looking for an apartment or house).

Despite a very crowded field in the intensely competitive online job search market, ranging from sites that have been offering job search for at least 5 years to brand new sites, from shoestring operations to well-funded startups to divisions of major worldwide corporations, no known job site -- or other search site -- has solved these problems.

Summary of the Invention

In the present invention, a computer with appropriate software provides an enhanced system for selecting one or more categories, or similar data element with more than 7 options, as part of a search form or otherwise.

The present invention overcomes prior art limitations by (1) using checkboxes or other toggle controls in a situation which runs counter to conventional recommendations in two ways: the checkboxes take up more screen space, and the standard presentation would violate the "5 plus or minus 2" guideline; (2) organizing the checkboxes into labelled subgroups to bring the interface back into conformance with the "5 plus or minus 2" guideline; and (3) arranging the

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subgroups in a two-dimensional (2D) format for quick visual access to the subgroup headings and the items within each subgroup.

It is an object of the invention to reduce the time and frustration associated with viewing and selecting from multiple options for a single data element, by providing a method and system wherein (1) the user can select or unselect any option with only a single click, no modifier key required; (2) selecting or unselecting an option does not affect whether any other option is selected; (3) the user can see at a glance which options are selected, a feature that is especially useful when the selections come from a previously stored search; (4) with all options visible, less time and effort is required to determine which options are most appropriate; and (5) with the options organized into subgroups, locating relevant categories can be done much more quickly since entire subgroups can generally be eliminated based on the subgroup's label -- and/or, having found one relevant option, the other relevant options are likely to be in the same subgroup and therefore immediately adjacent.

Other objects and advantages of the invention will, in part, be obvious, and, in part, be shown from the following description.

Brief Description of the Drawings

- Figure 1 depicts a typical category list in the prior art;
- Figure 2 depicts a hierarchical category list in the prior art;
- Figure 3 depicts the components of one embodiment of the invention;
- Figures 4a and 4b depict illustrative interfaces for category selectors according to the invention;
- Figure 5 is a flow chart depicting the steps for operating a single category control;

- Figure 6 is a schematic representation depicting one illustrative embodiment of the invention, wherein the invention is coupled to a network;
- Figure 7 is a schematic representation depicting one illustrative embodiment of the invention, wherein the invention interacts with a single electronic device.

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List of Reference Numerals

- 10 category selector system with components
- 10A-C category selectors
- 12A-E controls

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- 14A-E control labels
- 18A-B subgroup labels
- 16A-B subgroups
- 50 system with network
- 52A-52C IADs

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- 54A-54C Web browsers
- 56 network
- 58 HTTP Web server
- 62 search engine
- 64 data repository

20
- 68 server computer
- 90 system with single electronic device

Description of the Illustrative Embodiments

To provide an overall understanding of the invention, certain illustrative embodiments

25   will now be described. However, it will be understood by one of ordinary skill in the art that the

methods and systems described herein may be adapted and modified for other suitable

applications and that such other additions and modifications will not depart from the spirit and

scope of the inventive concept.

To more clearly and concisely describe the subject matter of the invention, the following definitions are intended to provide guidance as to the meaning of specific terms used in the following written description, examples, and appended claims. As used herein, the term or phrase:

5   "communications network" and "network" include a LAN, a MAN, a WAN, an Intranet, an Extranet, the Internet, a wireless network (e.g., according to the WAP protocol), and the like;

       "Information Location Mechanism" (hereinafter "ILM") includes software, firmware and/or systems capable of searching a data repository to locate information that meets

10   search criteria, such systems including database management systems, search engines supporting full-text search, search engines supporting fielded search, search engines supporting regular expressions and/or other patterns, and/or iterative search engines;

       "Information Sorting Mechanism" (hereinafter "ISM") includes software, firmware and/or systems capable of ordering data objects according to sort criteria, such systems

15   including database management systems, text processing library routines, etc.;

       "Internet Access Device" (hereinafter "IAD") includes personal computer systems (hereinafter "PCs"), computer workstations, desktop computers, laptop computers, hand-held computers, television set-top boxes, wireless access devices such as mobile telephones, cellular telephones, pagers, beepers, and other various hand-held wireless

20   devices, and all other devices that have at least one processor, UD and VDU, and are capable of accessing the Internet and/or other networks;

"processor" includes all components, devices, Integrated Circuits (hereinafter "ICs"),
modules, software, subsystems, and/or systems that provide control and/or perform
arithmetic and logical operations and/or extract computer instructions and/or decode
computer instructions and/or execute computer instructions, such as a Central Processing

5   Unit (hereinafter "CPU"), a microprocessor, a controller, and the like; including any
associated memory or other electronic storage of data and/or instructions;

"User-input Device" (hereinafter "UD") includes keyboards, keypads, mice, trackballs,
trackpads, wheels, joysticks, graphics tablets, voice recognition devices, motion sensing
devices and other devices for one or more users to enter text, numbers or other data

10   and/or for pointing, clicking, tapping, selecting, dragging and/or other gestures or actions;

"Visual Display Unit" (hereinafter "VDU") includes CRT screens, monitors, video
display terminals, LCD screens, LED screens, digital paper, and all other devices that are
capable of displaying analog or digital data;

Figure 1 depicts an illustrative embodiment of one system 10 according to the invention

15   which simplifies category selection. The system comprises a plurality of controls 12A-E coupled
with labels 14A-E, with a subset of controls 12A-E and labels 14A-E organized into a plurality
of subgroups 16A-B, with each subgroup including an optional subgroup label 18A-B.

For this illustrative embodiment, the controls 12A-E, labels 14A-E, subgroups 16A-B,
and subgroup labels 18A-B reside on a single computer 30 which may be a Macintosh G3

20   running MacOS 8.5. For this illustrative embodiment, the category selection system 10 is coded

in HTML for display in a Web browser such as Netscape Communicator, Microsoft Internet Explorer, Opera or iCab.

It will be readily apparent to those skilled in the art that the computer 30 could be a different Macintosh computer running a different version of MacOS or a different OS such as Linux, or an Intel or Intel-compatible PC or server running a version of the Microsoft Windows operating system such as Windows 98, Windows NT or Windows 2000, or an Intel or Intel-compatible PC or server running Linux or FreeBSD or other UNIX OS, or a computer from Sun, HP, IBM or other company, running Solaris, HP-UX, AIX or other variation of UNIX or other OS.

Figure 4a depicts one illustrative embodiment of a category selector for a job search. In this embodiment, the category selector is comprised of four adjacent subgroups, labelled on the top as "Technical," "White Collar," "Blue Collar," and "Misc.," respectively. Within each subgroup is a column containing four to six checkbox controls, each followed by an adjacent label. Each checkbox control represents a single category. Two checkboxes are selected: "Administrative" and "Clerical."

Figure 4b depicts one illustrative embodiment of a category selector for a job search. In this embodiment, the category selector is comprised of four subgroups arranged two across and two down, labelled on the side as "Technical," "White Collar," "Blue Collar," and "Misc.," respectively. Within each subgroup is a column containing four to six toggle controls, each including an embedded label. In the unselected state, a control has a white background; in the selected state, a control has a gray background. Two controls are selected: "Administrative" and "Clerical."

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With either embodiment of the invention, users can quickly see all subgroup labels. For many job seekers, only a single subgroup will be relevant so roughly three-fourths of the individual categories can be ignored without having to consider each by itself. Even for those job seekers who start by looking at individual categories, once they find a match, other relevant

5   categories are likely to be immediately adjacent. Selecting or deselecting any category can be done with a single mouse click, with no additional modifier key required, and no affect on which other categories are selected.

While some may initially perceive that the amount of screen space occupied by either control selector to be a drawback, the only consequence on a Web page might be one additional

10 scrolling action to initially bring the control selector into view or to scroll on to another part of the form, if any. Compared to the numerous actions required to scroll back and forth within a scrollable list, the single action is a clear winner.

It will be readily apparent to those skilled in the art that the interface could vary in many ways, such as by putting the subgroups in a different order, swapping rows and columns, etc.

15 It will be readily apparent to those skilled in the art that the interface could be modified to apply to other domains, e.g. with data elements such as "Skills" to search resumes of job seekers, or "Amenities" to search apartments for rent, or "Location" to search houses for sale, etc.

It will be readily apparent to those skilled in the art that the interface could be presented in many fashions, e.g. as an XML form, a PDF form, a form implemented in a Java applet or

20 Active X control, a form implemented using desktop or client-server software, or otherwise.

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Operation

Figure 5 is a flow chart that depicts the steps in selecting or deselecting a single control for this illustrative embodiment. Being presented with a set of controls, a user activates a control. If the control is selected, the category selection system changes the control state to unselected; otherwise to selected.

Alternative Embodiments

Figure 6 depicts another illustrative embodiment of one system 50 according to the invention which simplifies category selection over a network. The system comprises a plurality of IADs 52A-52C, each integrated with or coupled to a client process such as a Web browser 54A-54C displaying category selection systems 10A-C. Each IAD is coupled to a network 56, which is in turn coupled to an HTTP Web server 58, which is coupled to search engine 62, which is in turn coupled to data repository 64, and to HTTP Web server 58 to return matching data objects to the IADs 52A-52C to display for the users on client processes such as Web browsers 54A-54C.

For this illustrative embodiment, the HTTP Web server 58, search engine 62 and data repository 64 reside on a single server computer 68.

It will be readily apparent to those skilled in the art that the functions performed in this embodiment with a single server computer 68 could be divided among a plurality of server computers from the same or different manufacturers, with each computer running the same or different operating systems.

It will be readily apparent to those skilled in the art that the HTTP Web server 58 could

be WebStar, WebTen, Microsoft IIS, Apache or other commercial or open source Web server or

Web development system, such as UserLand Frontier, which includes a built-in Web server. It

will be readily apparent to those skilled in the art that search engine 62 could interact with HTTP

5   Web server 58 via CGI, plug-in, servlets, Enterprise Java Beans, etc.

It will be readily apparent to those skilled in the art that search engine 62 and data

repository 64 could be any suitable database management system such as Oracle, Informix,

Sybase, SQL Server, Access, mySQL, PostgreSQL, etc. or full-text search engine and associated

collection or other index mechanism such as those provided by Verity, UltraSeek, Thunderstone,

10   etc., and/or other software capable of storing and searching data. It will be further apparent that

search engine 62 and data repository 64 need not be implemented using the same software nor

even reside on the same computer.

Operation:

The user controls one or more UDs to activate a control via a Web browser 54 running on

15   an IAD 52. If the control is selected, the category selection system changes the control state to

unselected; otherwise to selected. Upon completing all selections, the user activates a trigger

such as a submit button, whereupon the Web browser 54 sends the selected categories and any

other search criteria over the network 56 via the HTTP protocol to the HTTP Web server 58

running on the server computer 68, which forwards the request to search engine 62. Search

20   engine 62 locates matching data in data repository 64 and sends the data objects as an HTML

page to HTTP Web server 58, which returns the HTML page over the network 56 via the HTTP

protocol back to the user's Web browser 54 which displays it on the VDU of IAD 52.

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Figure 7 depicts an illustrative embodiment of one system 90 according to the invention. The system comprises a single electronic device with at least one processor, at least one UD, at least one VDU and some form of storage, with the system 90 running software configured as one or more components to display the category selector, accept user input, perform a search on a

5   local or embedded data repository, sort the results, and return the results to the user.

It will be readily apparent to those skilled in the art that, as depicted in Figure 7, the category selector may have direct access to storage 20 and/or to search engine 62 and/or to data repository 64 and/or to a sort engine, reading the data from one or more locations according to the particular embodiment. It will be further apparent from Figure 7 that search engine 62, data

10   repository 64 and the sort engine have direct access to each other, such that any could access data on behalf of any other component according to the particular embodiment.

It will be readily apparent to those skilled in the art that one or more of the depicted individual components could be moved to a different device, situated locally or remotely, to, for example, support a remote data repository or have certain functions performed remotely.

15   As previously indicated, those skilled in the art will know or be able to ascertain using no more than routine experimentation, many equivalents to the illustrative embodiments and practices described herein. It will also be understood that the methods and systems described herein provide advantages over the prior art by providing an organized and convenient way for users to view and select categories so as to reduce the time and frustration associated with

20   searches. Accordingly, the scope of the invention should be determined not by the embodiments disclosed herein, but by the following claims, which are to be interpreted as broadly as allowed under the law.

Furthermore, it is to be understood that the terminology used herein is for the purpose of describing particular illustrative embodiments only and is not intended to be limiting. It must be noted that as used herein, including the appended claims, the singular forms "a," "an," and "the" include plural referents unless the context clearly dictates otherwise.

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